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ABSTRACT

Guidelines for developing an outdoor, educational laboratory are offered in this booklet. Stress is placed on establishing a laboratory that can be used with all aspects of the school's existing curriculum. Items regarding organization of a planning and guidance committee, user requirements, construction considerations to maintain the natural environment, and unique design features are elaborated. Also included is a checklist to aid in identifying environmental-conservation activities that can be conducted on school property, a bibliography, and a sample layout plan for an outdoor laboratory. (BL)

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OUTDOOR LABORATORY DEVELOPMENT

South Carolina Department of Education

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School outdoor laboratories can be used to help in teaching any subject.

This guide has been written to aid in the development of outdoor laboratories. It does not have lesson ideas--those can be found in the book "People and Their Environment: Teachers' Curriculum Guides to Conservation Education"--but it does tell how to construct an outdoor laboratory.

Even on the smallest schoolground it is often possible to set aside a corner of the land area for a small outdoor laboratory. Schools with more land may want to develop a more extensive site. While size is a factor, more important is the fact that an outdoor laboratory can be used with all aspects of the schools's existing curriculum.

Schoolgrounds can become a valuable extension of the classroom. However, like classrooms, they need some planning to make them as usable as possible. Both new and existing schools, both urban and rural, can have excellent outdoor laboratories.

Organization

A committee of teachers should work together in developing the site. This committee should be a cross section of the teachers who will use the site, but membership should not be so large that it is cumbersome. All other teachers in the school should know who is on the committee to make suggestions to the members.

In an elementary school, a committee could have one teacher from grades K, 1 and 2, one from grades 3 and 4, and one from grades 5 and 6, plus the assistant principal or head teacher as chairman. In this way, three teachers would be able to make sure all age groups were considered in the plans.

A high school or junior high might have one person from each subject area on the committee - such as one social studies teacher, one science teacher, a math teacher, a language arts or literature teacher, a home economics teacher, and a vocational teacher, with the assistant principal as chairman. Care should be taken to assure a balanced representation on the committee.

It is advantageous for the committee to call on resource people for assistance. These include representatives of the Information and Education Office of the State Forestry Commission, the Information and Education Section of the Wildlife Resources Department, the local Soil and Water Conservation District officer and State Conservation Commission, as well as the Conservation Consultant from the State Department of Education. These people can help select the best places for plantings,

plantings most suitable for nesting and cover, soil study sites, forest plantation sites, and how these and other related activities can be used in the existing curriculum. These services are provided at no cost, so that this valuable assistance will not increase the cost of development.

Users

The first step in planning the outdoor laboratory is to determine who will use the facility. The outdoor laboratory may be located between two or more schools and be used by all grade levels, or it may be used by only one school and as a result used by only elementary or high school students. Which level of student uses the laboratory will help decide what type of signs and detailed information should be presented. Remember that the laboratory should be capable of use in all subject areas.

Consider the possibility of summer and weekend use by scout groups, church groups and interested citizens of the community. If such groups are encouraged to use the outdoor laboratory during periods when the school is closed, it is advisable to have restrooms available near the entrance to the outdoor laboratory.

Construction

The actual construction of nature trails and study sites should make as much use of the existing environment as possible. Do not introduce trees and other plant species that are not native to the area, unless these species are recommended by the resource people. If a geological walk is developed, try to use geological material from the local area rather than importing fossils or petrified wood. Remember, the purpose of the outdoor laboratory is to allow a place for the student to study his environment.

Another important consideration is the construction of a pond. Is there a stream that can be used to study aquatic life? If so, would it

be desirable to dam a portion of it to make a study pond? If there is no stream, is there a way a pond could be excavated and filled from ground water?

The answers to these questions depend almost entirely upon the individual school and grade levels using the outdoor laboratory.

While an urban outdoor laboratory probably will not have a great diversity of trees and shrubs, the ones that are found around the school can be utilized for a large number of lessons. In both urban and rural areas, tracking stations can be set up to see what "wild" animals are frequently on the school grounds.

Bird feeders will, of course, attract many birds in a city, and can lead to many lessons. Grasses growing in sidewalk cracks or sidewalks that are being lifted by tree roots should also be incorporated into urban outdoor laboratories. The urban outdoor laboratory should also include a vantage point for observing traffic and relating it to air pollution, noise pollution, traffic congestion, etc.

Depending on community involvement, the outdoor laboratory may be open for community use after school and in the summer. If this is the case, then more consideration must be given to trail markers than if the laboratory is used only by school groups.

Before picking specific study sites in the outdoor laboratory, consider whether the paths will be self guiding. Will all signs be fully explanatory or should there be pamphlets which have detailed descriptions corresponding with station numbers? These can be picked up at one end and dropped at the other. Or, will there be a guide available whenever a group desires to use the outdoor laboratory?

Usually the self-guided trail is quite satisfactory, but pamphlets can present a litter problem if there is not a place to deposit them at the end of the trail. Pamphlets can also be written on two levels - elementary and secondary - whereas it is more difficult to do this with interpretive signs.

Design

Actual physical layout of the outdoor laboratory will depend upon the total size of the area. If it is a large area, a series of inter-connected trails or walkways are usually better than just one trail. This allows the teacher to vary both the activities and the lengths of time spent in the outdoor laboratory on different occasions.

Consideration should be given to planting some native shrubs in one area which will attract birds and to providing an observation area for the students nearby. Almost any plant with a residual fruit will attract birds and some small animals. An animal tracking station might be set up with a salt block or other attraction to animals put out. The ground around the block should be cleared so all footprints will clearly show. Weather instruments should be near the entrance so groups can check changes in temperatures, wind direction and barometric pressure on reaching and leaving the outdoor laboratory.

Take advantage of all unique features on the site. If there is an example of gully erosion, put in plantings to retard it, but also use it to show how gully erosion occurs and what it does. You may want to put vertical iron pipes in various places down the gully with the ground level painted on them and the height to the top marked so students can see how much erosion has taken place any time after the outdoor laboratory has been opened.

Lifewise, dead trees should be left standing unless there is a serious danger of their falling and hurting someone. These are used as nesting sites by a wide variety of birds, and in fact, some students have referred to them as the "original high rise apartment buildings."

Where there is a rock outcrop, it should be utilized as a geological time marker. Time can also be related to tree stumps. Take out as few trees as possible, but if one or two must be removed, leave the stump, plane it off so it is smooth, and then mark the year the tree was cut. By looking at the stump, students should be able to discuss past weather patterns, growth rates, burn scars or insect damage in various years, and other interesting lessons.

One area could be marked to show what plants are in it at the time of development and then left totally undisturbed so stages of succession can be recorded.

Trails should be winding rather than straight. A winding trail lets students anticipate what is beyond the next bend. It is also easier to hold the student's attention if he cannot see the next station. As teachers become familiar with the outdoor laboratory, they will probably begin to use some of the study sites less and develop new ones of their own. This should be encouraged because teachers and their students have use of the outdoor laboratory most frequently.

If your school does not have enough land for an outdoor laboratory with trails, sites can still be set aside for studying plant succession, soil types, birds and animals, etc., in different corners of the playground.

Soils can be studied at various sites along the trail. Have students look for differences in soil color, grain size or texture, composition and degree of compaction.

If you have a large amount of land, you may want to plant one area in a specific species to determine optimum spacing, growth characteristic, time to reach maturity, and yield at maturity in terms of board feet of timber trees or yield in terms of fruit or nut trees. This will require accurate records that can be passed from one class to the next.

If there is a stream or pond (either natural or man-made), a dock should be constructed so that water samples can be taken at various depths in the pond. A dock also allows dip and plankton nets to be used near the center as well as along the shoreline. Biology classes can keep a record of the dissolved oxygen content of the water and the biological oxygen demand in an ongoing pollution study.

In planning the development of such a facility, consult the Soil and Water Conservation district commissioner for assistance. Also contact the State Forester's office and the Wildlife Resources office as well as the Conservation Consultant of the State Department of Education and the State Conservation Commission.

For lesson ideas that can utilize an outdoor laboratory, see the "People and Their Environment" published by the J. G. Ferguson Publishing Company, Chicago, Illinois, especially the book entitled "Outdoor Laboratory 1-12."

The land around any school can be used for environmental education experiences.

Filling out the attached checklist should give you a better idea of what environmental conservation activities can be conducted on school property. Conducting activities on the school's property is advantageous in that it does not require arrangements for field trips or time spent traveling from the school to different locations. Vegetation, soil, and other environmental factors are usually more like those around the students' homes than can be found on a field trip to a distant location.

School Building

_____Wood frame
_____Stucco
_____Brick
_____Other

Trees (put percentage each)

_____ Shade trees
_____Native
_____Planted
_____Deciduous
_____Coniferous
_____ Plantations
_____Species
_____ School forest
_____Species

Shrubs

_____ Foundation plantings
_____ Hedges (windbreaks, dust or noise filters, erosion checks, etc.)
_____ Bushes

Grass areas

_____ Lawn (soil stabilization, flowers, landscaping)
_____ Playfields (soil stabilization)
_____ Wild grass

Forb area (Forbs are non-woody, herbaceous plants, e. g. goldenrod, bull thistles, etc.)
_____ Annual plants
_____ Perennial plants

Barren areas

_____ Paved areas
_____ Eroded areas
_____ Graveled areas

Water areas

_____ Stream
_____ Pond
_____ Puddles
_____ Ditches
_____ Storm sewers and gutters

Elevations

_____ Hill slope
_____ Gradual
_____ Steep
_____ Hilltops
_____ Gully sides from erosion

Animal signs

_____ Homes (in trees, under roots, holes in the ground, on tree branches, in drain pipes, etc.)
_____ Droppings (on stumps, sidewalks, grass, side of building, etc.)
_____ Tracks (in mud, dust, etc.)

Wetland areas

_____ Swamps (forested or in shrubs and bushes)
_____ Bog
_____ Marsh (cattails, grasses, reeds, etc.)
_____ Flood areas (sedimentation, debris, etc.)

Rock and Mineral areas

_____ Stone walls
_____ Sidewalks
_____ Driveways and parking lots (graveled)
_____ Curb Stones
_____ Eroded areas (exposed rocks)

Outlying areas (near the schoolgrounds)

_____ Open fields
_____ Croplands
_____ Orchards
_____ Deserted farms
_____ Old graveyards
_____ Old building foundations
_____ Tree stumps
_____ Fence rows
_____ Nursery (trees, shrubs, etc.)
_____ Local park
_____ State or National Park
_____ Vacant Lots
_____ Excavations

All the items you have checked in the categories can be used in environmental conservation lessons. The same item can often be used for more than one lesson or topic, i.e., a pond can be used to help illustrate the water cycle, food webs, ecosystems, a community water supply, different soil types, etc.

August 17, 1971